

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/576,033
Applicant : Milliren, Charles M.
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Title : VISCOELASTIC FOAM LAYER AND COMPOSITION

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Examiner : Cooney, John M.

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Commissioner for Patents
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REPLY BRIEF

This Reply Brief is hereby timely filed in response to the Examiner's Answer.

A. Response to Examiner's Inclusion of the Objection to Paragraph [0048] in the Grounds of Rejection Section

As discussed in the Appeal Brief (page 24), because the applicant's amendment of paragraph [0048] on December 17, 2008 is objected to in the current final rejection, the Board is not required to consider the objection. Should the Board consider the current objection to amended paragraph [0048], the applicant firmly believes paragraph [0048] provides written description of the invented foam as shown Figure 1, and is fully supported by Figure 1.

More specifically, Figure 1 graphically represents acceleration versus velocity of the performance of the invented viscoelastic foam of Example 1, and as referenced by paragraph [0011]. As stated by the specification, results of impacting the invented foam of Example 1 are provided in Figure 1 (graphically), wherein the invented foam of

Example 1 exhibited significantly less breakthrough acceleration (i.e., g's) than EPS for impact velocities from about 2 to about 6.5 m/s (see paragraph [0048]). Original paragraph [0048] uses "about" to describe the graphical data of Figure 1. The added written description of the invented foam, which is objected to, merely provides a description of the graphical data shown therein, and does not add matter that is not supported by Figure 1 or suggested by the original specification, which specifically states that the invented foam of Example 1 exhibits lower breakthrough acceleration (i.e., g's). Figure 1, at about 2 m/s, does graphically show an acceleration of about 100 g's, and at about 6 m/s an acceleration of about 150 g's. Plainly stated, the graphed line for the invented foam crosses at about the 100 g's mark at about 2 m/s, and at about the 150 g's mark at about 6 m/s.

It has been held that drawings may provide an adequate written description of an invention. For example, *In re Wolfensperger*, 302 F.2d 950, 133 USPQ 537 (CCPA 1962), is an instance of when the original drawings were used to provide written description of the invention under Section §112. In that case, the CCPA stated:

"... consider that the only informative and significant disclosure in many electrical and chemical patents is by means of circuit diagrams or graphical formulae, constituting "drawings" in the case."

"The practical, legitimate inquiry in each case of this kind is what the drawing in fact discloses to one skilled in the art. Whatever it does disclose may be added to the specification in words without violation of the statute and rule which prohibit "new matter," 35 USC 132, Rule 118, for the simple reason that what is originally disclosed cannot be "new matter" within the meaning of this law. If the drawing, then, contains the necessary disclosure, it can "form the basis of a valid claim." *Id.* 133 USPQ at 541-42.

In *Wolfensperger*, the CCPA held that figure 5 of the application clearly showed that the ring had a mean diameter corresponding to approximately the mean diameter of

an annular chamber. In this regard, the CCPA held that the application satisfied the written description requirement, and that drawings may provide the basis for subsequent amendments to the specification without violating the prohibition against new matter.

In view of the foregoing, applicant respectfully submits that the description of Figure 1 in amended paragraph [0048] does not add new matter to the application because Figure 1 in fact discloses the added written description.

Nevertheless, without consideration of the current objection to paragraph [0048], the applicant believes that the originally-filed specification and Figures, separate from the objected amendments to paragraph [0048], provide adequate support such that claims 66 and 67 satisfy the requirements of 35 U.S.C. § 112, first paragraph as discussed in detail on pages 24-27 of the Appeal Brief. Notably, in the Appeal Brief, because the Board is not required to consider the current objection, the § 112 rejection of claims 66 and 67 is specifically addressed without reference to the present objection to the amendments of paragraph [0048].

B. Response to Examiner's Arguments Concerning the Rejection of Claims 35-37, 39-48 and 51-68 under 35 U.S.C. §103(a)

I. "Semi-rigid" is patentably distinguishable from the Apichatachutapan et al. ("Api") reference

Api is directed to viscoelastic foams, however Api only teaches and fairly suggests, considering the entirety of its disclosure, flexible flame-retardant viscoelastic foams. As addressed by Dr. Milliren's declaration, the data presented in Api's examples recites that the foams were tested for IFD and sag factor. In stark contrast, the claimed semi-rigid foams cannot be tested for IFD or sag at least because they are too rigid to fall within the property limits of soft flexible foams. Moreover, the claimed semi-rigid foams showing energy absorption characteristics at various dynamic impact speeds are distinguishable from flexible foams as in Api because such flexible foams do not exhibit any appreciable degree of dynamic impact energy attenuation and would be

instantaneously compressed. Although it is argued that Api's foams exhibit impact and strength properties which are not different than that of the claimed semi-rigid foams (page 5 of Examiner's Answer), such a conclusion is not supported by any disclosure or showing in Api. Rather, as noted above, the tested Api foams show properties indicative of only flexible foams, and which are not capable of being measured in the claimed semi-rigid foams. The fact that Api invites random experimenting with thousands of possible compositions for polyurethane foams, including the use of any available polyol in any combination and weight percent, does not provide a basis to argue that every possible combination is taught or fairly suggested by Api without consideration of Api's stated purpose of being directed to flexible and flame-retardant foams. A skilled artisan familiar with viscoelastic foams and dynamic impact energy attenuation would not turn to Api for a teaching on foams exhibiting such impact attenuation, but would clearly recognize that Api is directed to soft, flexible flame-retardant foams that do not exhibit the properties of the claimed foam. It is clear that semi-rigid foams as claimed function and possess unique properties not present in Api's foams, and thus "semi-rigid" is in fact a patentably distinguishable feature from Api's disclosure.

II. The Api reference does not teach or fairly suggest the use of a PO-extended amine-based polyester polyol being at least 3-functional and having substantially no EO extension to make a semi-rigid viscoelastic foam

The Examiner argues that the appellant has not sufficiently overcome the present obviousness rejection by arguing that Api lacks specificity regarding the claimed amine-based polyester polyol and substantially no EO extension limitations. As the basis for this conclusion, it is once again argued that Api is not limited by its examples and that because select portions of Api invite random experimentation that might eventually, and inadvertently, meet the claimed limitations, the Api reference as a whole fully teaches and suggests the claimed foam. However, such a focus on limited disclosures without consideration of the reference as a whole improperly characterizes what is fully taught and/or suggested by Api. Still further, the Examiner's Answer has not addressed the fact

that, in the unpredictable arts, a claimed combination is not obvious especially if a reference's teaching undermines the exact reason being argued as to why a person of ordinary skill would have combined the elements.

It is clearly taught by Api that any polyol, including that the same polyol can be used for every component, and can be selected for any of the three possible isocyanate-reactive components. Api provides no guidance how to prepare a semi-rigid viscoelastic foam or how to combine the endless list of polyols to arrive at the claimed foam for impact attenuation, which Api does not even present as a goal or a feature of its own foams. In fact, Api does not provide one example using an amine-based polyol with no EO extension as claimed. The only time Api uses an amine-based polyol (i.e. PLURACOL 355) a non-flame retardant foam was produced conforming to Api's purpose. As an explanation for the failure of the foam, Api discloses that the foam may have failed precisely because of the presence of the amine-based polyol. The only successful examples used non-amine based polyols. Although Api's examples do not derogate from its full teaching, it is not seen how Api's overly-broad disclosure can be fairly relied upon to suggest a combination to arrive at the presently-claimed foam, when all of its endless possible compositions do not even work for Api's intended purpose (as evidenced by the examples section). The fact that certain combinations of Api's disclosed polyols, and in particular an amine-based polyol, do not work for its intended purpose directly undermines any argument that a skilled artisan would select an amine-based polyol, especially when that person is trying to make a semi-rigid viscoelastic foam having impact attenuation properties (i.e., a different purpose not discussed in Api). Not only does the failed example undermine Api's fair teaching, but Api explicitly discloses that the presence of an amine-based polyol likely resulted in the unsuccessful non-flame retardant.

III. The claimed foam was an unexpected and surprising result

The Examiner argues that the appellant has not demonstrated that the claimed foam is unexpected and more than mere optimizations of the knowledge in the art.

Further, it has been argued that the appellant has not demonstrated his showing to be commensurate in scope with the combinations now claimed.

There are 4 pending independent claims – 35, 54, 66 and 68. Independent claims 35 and 54 specifically require at least 40 parts by weight of a propylene oxide-extended amine-based polyether polyols being at least 3-functional and having an OH number less than or about 150 and having-substantially no ethylene oxide extension units. Independent claim 68 more narrowly requires at least 40 parts by weight of propylene oxide-extended triethanolamine-based polyether polyol having an OH number less than or about 150 and having substantially no ethylene oxide extension units. With regard to these three independent claims, the required polyol component is specific in terms of weight percent, make up (PO-extended & amine-based), functionality (3-functional) and OH number (less than 150). Moreover, claim 68 requires triethanolamine per se. A review of Dr. Milliren's declaration indicates that it is directed to semi-rigid, recoverable viscoelastic foams made from amine-based polyether polyols which are PO extended and have substantially no EO extension units. The declaration also addresses the Examples in the present application, including 3-functional amine-based polyether polyols which are PO extended and have substantially no EO extension units, such as triethanolamine. It is not seen how the submitted declaration is not commensurate in scope with the combinations now claimed.

It also is clear from the declaration that the claimed foams are not mere optimizations as argued. The Examiner's answer does not appear to address the content of the declaration or the arguments laid out in the Appeal Brief. The chemical arts are unpredictable, and predictability requires the expectation that prior art elements are not only capable of being combined, but that the combination is expected to work for its desired purpose. Dr. Milliren states that based on his 30 plus years of professional research and development experience, each component that goes into a polyurethane foam composition can affect the characteristics of the final foam in an unpredictable way based on its effect on the foam's morphology and physico-chemical structure, which cannot be specified *a priori*. Amine-based initiators, such as those claimed, are highly reactive polyols which produce foams with high degrees of cross-linking compared to

foams produced using polyols based on other initiators, e.g., glycerin. As such, amine-based initiators have higher cross-linking rates and typically result in much stiffer, more rigid foams. Regarding extension units, EO extension is employed to provide flexibility, whereas PO extension tends to increase rigidity. Thus, the expectation for one skilled in the art would be to not end up with a polyurethane foam made from at least 40 parts by weight of an amine-based polyether polyol having substantially no EO units that is semi-rigid, viscoelastic and recoverable. Rather, the high amine-based initiator reactivity and lack of EO extension would lead one to expect a fully-rigid and unrecoverable foam. A person of ordinary skill in the art would have no expectation of success to achieve the recoverable semi-rigid viscoelastic foam as claimed.

C. Response to Examiner's Arguments Concerning the Rejection of Claims 66-67 under 35 U.S.C. § 112

The Examiner argues that Figure 1 identifies the performance of only one foam composition (i.e. Foam #2 of Example 1) and thus cannot be representative of other disclosed foam compositions, including those of the other Examples of the present application. However, for instance, Example 1 also discloses that all eight foams were subjected to dynamic impact testing and the results are reported in Table 3 therein (see paragraph [0064]). A comparison of the impact velocities and peak g-values in Table 3 to the data graphed in Figure 1 clearly indicates that the other foam compositions have substantially the same properties as Foam #2 as graphically represented in Figure 1. For example, Table 3 shows that at an impact velocity of about 6.25 m/s the majority of the foams were observed to have peak g-values in the range of 180-190. A review of Figure 1 indicates a peak g-value of about 175 at about 6.25 m/s. Because the other foams were observed to have substantially the same impact attenuation properties it is not only proper to assume or expect the other foams of Example 1 to have the same impact attenuation properties as Foam #2, but the data reported in Table 3 shows that to be the case. The mere fact that graphs were not shown for every foam composition does not derogate from the testing that was performed on the other foams of Example 1 and the test results

reported in Table 3. Accordingly, it is believed that claims 66 and 67 are properly supported by the original disclosure, including the Figures and Examples of the specification.

The term “about” also has been argued to not be supported by the application’s disclosure and that only the precise values of the exact foam compositions that were tested are permitted. The term “about” does not generally render a claim indefinite, but merely relaxes the precision of the claimed value as is appropriate for values derived from testing samples. This is clearly understood by those skilled in the art when encountering the term “about” because it provides a clear indication that exactitude is not being claimed. “About” 100 g’s is sufficiently precise to be definite in the art of measuring breakthrough acceleration. It reasonably quantifies the relevant property of the claimed foam and it is sufficiently clear to apprise a person skilled in the art of the scope of the claimed invention. One skilled in the art of foams would understand that “about” is not an arbitrary term, but rather a word with a meaning similar to “approximately” that indicates an absence of absolute precision in a numerical value. Courts and the USPTO have long recognized that “about” does not generally render a claim indefinite. See *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1557 (Fed. Cir. 1983), cert. denied. As such, claims 66 and 67 are sufficiently described in the application as to reasonably convey to one skilled in the art that the inventor, at the time the application was filed, had possession of the claimed invention.

Conclusion

For at least the above reasons, the prior art cited by the Examiner fails to teach, suggest or otherwise render obvious every limitation recited in the claims as required to maintain a rejection of those claims under 35 U.S.C. §103. Additionally, in view of the content of the originally-filed application, the Examiner’s basis for the rejection of the claims under 35 U.S.C. §112 is improper.

Respectfully submitted,
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